

## REMARKS

Claims 1 – 3, 5 – 10, and 12 – 15 are currently pending. In view of the following remarks, reconsideration of the application is respectfully requested. Applicant and Applicant's attorney would like to thank Examiner Harry Wilkins, III for the courtesies extended in granting the interview on January 12, 2004.

In the Advisory Action, the Examiner states that "in response to Applicant's arguments regarding the amount of Mn present in the alloy of Kulmburg '574, Applicant is reminded that the teachings of the prior art should not be construed as being limited only to specific examples contained therein." Moreover, the Examiner states that "Applicant's statement at page 2, lines 11 – 13 of the specification is an admission of prior art because it states that 'recently introduced' porcelains have certain coefficients of expansions." The Examiner states that "this is an admission that those porcelains existed before the present invention." The Examiner further notes that "regarding the arguments about the addition of Au, the fact that Applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious." For the reasons set forth below, these statements are respectfully traversed.

As discussed in the interview with the Examiner, the properties of alloys can be very sensitive to the addition and removal of certain components. Adding Mn to one alloy may increase the coefficient of thermal expansion, while adding it to another may decrease the coefficient, as shown in Kulmburg '574. The combination of the components in the alloy of the claimed invention provide a unique alloy having a coefficient of thermal expansion in the range of from about 16 to about 18. It would not have been obvious to achieve Applicant's invention by combining Kulmburg '574, Prasad '684 and the statement by Applicant in Applicant's specification, since there is no motivation to combine such references besides the motivation provided by hindsight of Applicant's invention. Applicant's invention shows a high coefficient of thermal expansion with an amount of Mn at 4% or greater. This effect has the completely opposite result in Kulmburg '574 which shows the coefficient of thermal expansion being lower for the higher amount of Mn. Therefore, the combination of Kulmburg '574 with Prasad '684 would show a low coefficient of thermal expansion. There is nothing in the

combination to suggest a higher combination. The statement in Applicant's disclosure would not have led to a higher coefficient of thermal expansion in the Kulmburg '574 and Prasad '684 references. To modify the compositions of Kulmburg and Prasad to achieve higher coefficients of thermal expansion would require inventive work and is not an obvious modification. As stated above, dental alloy compositions can be very sensitive to the addition and removal of components such that the properties can change drastically by slight modifications or the properties can change very little by large modifications. It is an inventive science which requires research and development, not merely obvious design steps.

As stated above the combination of Kulmburg '574 and Prasad '684 with applicant's specification does not render the invention obvious. Chiaramonte '642 does not cure the deficiencies of the Kulmburg '574 and Prasad '664 references. Chiaramonte '642 is unlike the claimed invention and is unlike the alloy in Prasad '664. The small amount of gold added to the instant invention, 1 to 5 wt %, does not change the color of the white alloy to a gold color. Chiaramonte '642 is not concerned with a specific coefficient of thermal expansion. The coefficient of thermal expansion of the alloy of the claimed invention is much greater than that taught by Prasad '664. There is no showing or suggestion in Chiaramonte '642 to add or alter components in the composition therein in order to affect or alter the coefficient of expansion. The combination of various metals in an alloy composition is not straightforward depending on which metals are already present, since different combinations will produce overall different results. The purpose of adding gold to the composition of the claimed invention was not to alter the color of the alloy. In fact, the inclusion of gold can compromise the corrosion behavior, if not controlled properly. The claimed invention is not rendered obvious over the combination of cited references

In summary, none of the references, alone or in combination, teach applicant's invention directed to a cobalt-chromium dental alloy comprising by weight percent about 60 to about 85% cobalt, about 15 to about 30% chromium, about 4 to about 20% manganese, and about 1 to about 15% aluminum, indium, gallium, tin, or germanium, or mixture thereof, wherein the coefficient of thermal expansion (CTE) at room temperature to about 500 °C is about  $16 \text{ to } 18 \times 10^{-6}/^{\circ}\text{C}$ . Moreover, none of the cited

references teach applicant's invention directed to a cobalt-chromium dental alloy comprising by weight percent about 65 to about 80% cobalt, about 18 to about 25% chromium, about 4 to about 10% manganese, about 2 to about 10%, iron, nickel, palladium, or platinum, or mixture thereof, about 1 to about 7% aluminum, indium, gallium, tin, or germanium, or mixture thereof, about 1 to about 5% gold, and about 0.1 to about 3% iridium, ruthenium, rhenium, titanium, silicon, or copper, or mixture thereof, wherein the CTE at room temperature to about 500 °C is about  $16$  to about  $18 \times 10^{-6}/^{\circ}\text{C}$ . None of the references show or suggest applicant's claimed invention and notice to this effect is respectfully requested.

Accordingly, it is believed that claims 1 - 3, 5 - 10, and 12 - 15 specify patentable subject matter and are now in condition for allowance. Applicant therefore respectfully requests favorable reconsideration and allowance of this application. The Examiner is requested to telephone Applicant's attorney at the number listed below if it will advance the prosecution of this case. If necessary, the Examiner is authorized to charge further fees necessary to advance the prosecution in this case from Deposit Account No. 500718.

Respectfully submitted,



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